

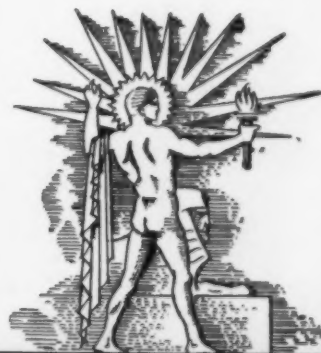
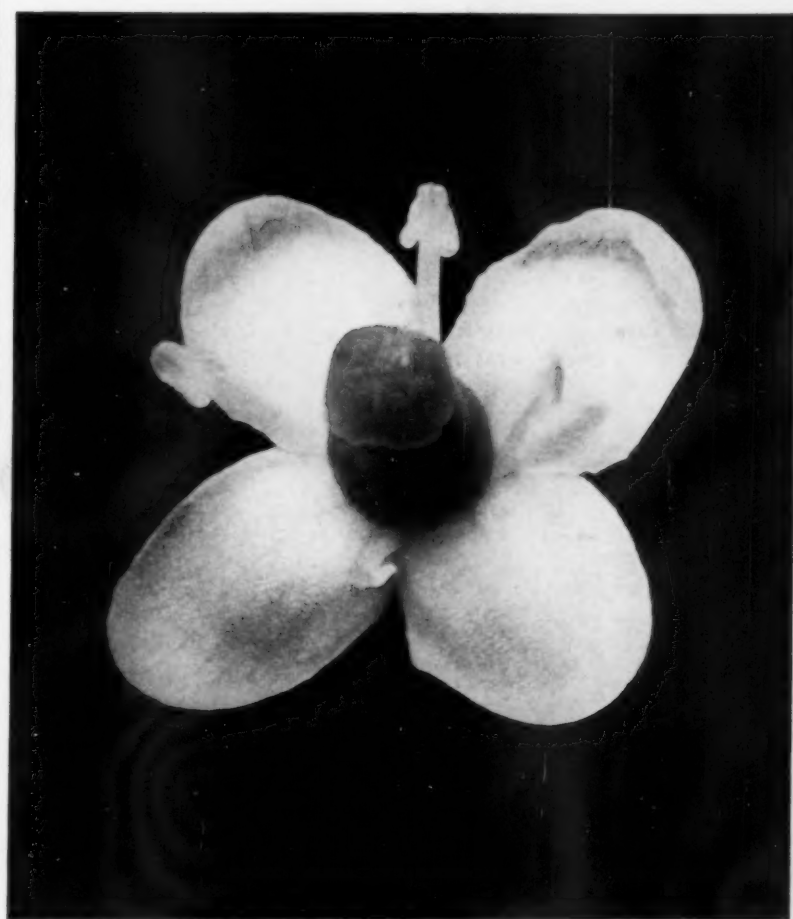
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE.



DECEMBER 19, 1936

Bloom of the Holly

See Page 399

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. XXX



No. 819

The Weekly

Summary of

Current Science

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DO YOU KNOW?

Many fires in the home start by the replacement of blown fuses with pennies.

Fifty-five Arctic weather stations are now in operation along Soviet shores and islands.

Paper dishes, made by a special process, are being used on a large scale for food and drink in Soviet Russia.

The first letter written on a typewriter in the United States is in the historical collection of the Smithsonian Institution at Washington.

Ten thousand miles by airplane in twelve days recently brought a package of valuable drugs from New York to a hospital in Pretoria, South Africa.

An 80-quart mixing machine and an electric toaster that handles 2,800 slices of bread an hour are among the new devices for hotel kitchens.

British engine manufacturers are interested in a new chrome-hardening process which increases wear resistance in Diesel engine cylinders by as much as 400 per cent.

Growth of fungi produces numerous materials with important industrial possibilities.

East Indian scientists have been making tests to learn why donkey's milk is more digestible than cow's milk.

The boundary dispute between Ecuador and Peru involves an area claimed by both nations, as big as the State of New York.

The bone deformity called perosis in young chickens is traced to lack of manganese and certain other inorganic elements in their diet.

An anthropologist who studied skeletons of Egyptians living before the dynastic era, found arthritis of the spine in 40 per cent of cases.

The U. S. Forest Service has made tests to find the best colored goggles for men who have to endure glare and sunlight while watching for forest fires.

The modern French governess had an equivalent in ancient Rome—well brought up children spoke Greek from infancy, generally taught by a Greek.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ARCHAEOLOGY

From what place did good little children get their toys 5,000 years ago? p. 394.

How was the first Christmas pictured in the ancient Land of Egypt? p. 393.

ASTRONOMY

Was the Star of Bethlehem three bright planets? p. 393.

AVIATION

How close will airplanes of the next decade bring Europe? p. 390.

AVIATION-METEOROLOGY

What effect will Boulder Dam Lake have on flying? p. 391.

BIOLOGY-ANTHROPOLOGY

Can a plant be used as an "electric eye"? p. 387.

BIOPHYSICS

How were crystals of the tobacco mosaic virus obtained? p. 393.

DENDROLOGY

Is the oak a Christmas plant too? p. 399.

GEOLOGY

Where does a forward-moving glacier steadily retreat? p. 393.

HYGIENE

Should visitors to the tropics drink mint juleps? p. 389.

METEOROLOGY

Why do some Indians believe this winter will be cold? p. 392.

MUSEUM SCIENCE

How can museum birds be made to move and sing? p. 398.

PHYSICS-ASTRONOMY

What astronomical test has been proposed for the relativity theory? p. 388.

PHYSIOLOGY

How is the breathing mechanism of the newborn started without "cranking"? p. 392.

What damage do students do their eyes in college? p. 392.

PLANT PHYSIOLOGY

What chemical will aid in keeping the Christmas tree green? p. 392.

TECHNOLOGY

What honor has been bestowed upon Dr. Clarence J. West? p. 389.

BIOLOGY-ANTHROPOLOGY

Living Photocells Used In Carnegie Institution Tests

New Understanding Gained of Plants' Method of Capturing Carbon Dioxide; Studies of Apes and Men

NOT a glass-and-wire photoelectric cell but a genuine living plant cell was used as an "electric eye" in experiments reported to trustees of the Carnegie Institution of Washington, when President John C. Merriam presented his annual report of the research activities of his far-flung scientific staff.

The work was done by Dr. Gordon Marsh, at the Tortugas Laboratory of the Institution, off the southern tip of Florida. The cells used were those of the strange sea plant *Valonia*. They are giants among cells. In fact, the whole plant is a single enormous cell, ranging from the size of a pea to that of an egg. Most cells of course are exceedingly tiny, invisible except under a strong microscope.

In the experiments, these huge *Valonia* cells had wires attached to their opposite ends, leading to a delicate current-detecting instrument. The cells, like all living cells, constantly generate very weak electric currents.

Dr. Marsh kept his cells in a light-tight box, and through an opening illuminated them with light from strong electric lamps. He varied the illumination intensity from zero or total darkness to 7,000 foot-candles. The plants responded by producing more current in response to strong light than they did in darkness or weak light.

Dr. Marsh does not consider *Valonia* a practical substitute for the artificial photoelectric cells now on the market, but regards his experiment as giving a promising lead for further study of the electrical and other properties of living cells.

Capturing Carbon Dioxide

An important step toward the understanding of how green plants capture the waste gas carbon dioxide out of the air and turn it into food is reported by Dr. H. A. Spoehr, director of the Institution's division of plant biology, with headquarters at Stanford University.

The outstanding fact turned up by this research is that while light is needed

for the completion of the food-making process, the first step, which is the capture of carbon dioxide from the air and holding it in solution, goes on independently of light. Leaves kept in the dark, and leaves without green pigment, were alike able to absorb and hold considerable quantities of the gas. Stems and roots also absorb some carbon dioxide, though less than leaves do, and flower petals still less.

Of especial apparent significance is the fact that leaves take in considerably more carbon dioxide than can be accounted for on the simple basis of its solubility in water. This means that the leaves carry on some direct and active process, rather than simply passively soaking up the gas. What this process may be remains for further investigation, though Dr. Spoehr and his associates have a few promising-looking leads.

Man Less Evolved Than Apes

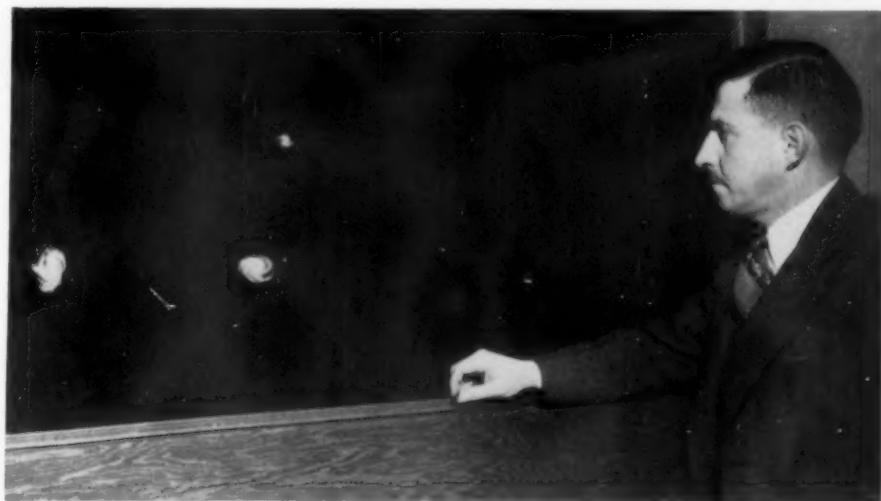
Man is not as highly evolved, in some respects, as several species of the great apes. The newly discovered differences are in the internal organs of the great apes, which have been less studied than their bones and skins because they are more difficult to preserve. The present research was conducted by Dr. W. L. Straus, Jr., at the Institution's laboratory of embryology in Baltimore.

The orang-utan is more highly specialized than man in certain lung structures, and the gibbon is most advanced with respect to the position of the heart and certain of the major blood vessels that rise near it. Man maintains an evolutionary lead so far as certain parts of his digestive tract are concerned, but is more primitive than the gibbon in his heart and the first great arterial branches.

In his study, Dr. Straus finds nothing to indicate that man possesses any peculiarly close affinities with the chimpanzee-gorilla stock as commonly accepted. He finds man just as closely related to the gibbons.

Nose Cartilages

Dr. A. H. Schultz, also of the Institution's department of embryology, has made a special study of the nasal cartilage of the great (Turn to page 396)



NEIGHBORS IN SPACE

Dr. Sinclair Smith demonstrating at the annual exhibit of the Carnegie Institution of Washington a model of our own Milky Way and its two neighboring galaxies. The whole Universe is now seen by scientists as a vast space approximately a billion light-years in diameter in which these galaxies are rather uniformly distributed. The galaxies are separated by distances between 10 and 100 times their own diameter, and each attains millions of stars which are themselves separated by large distances.

PHYSICS-ASTRONOMY

Attic Genius Wins Einstein's Approval for Relativity Test

Great Mathematician Helps Obscure Czechoslovakian To Present Ideas on Astronomical Test of Theory

ANOTHER tale of the human, kindly side of Prof. Albert Einstein can now be told; the story of how he aided an obscure Czechoslovakian dishwasher to present some original astronomical ideas to the world of science when all other doors were shut against him.

Press association wires and the leading metropolitan newspapers recently gave prominence to the brief report published by Professor Einstein in the magazine *Science* (Dec. 4), official publication of the American Association for the Advancement of Science.

Dr. Einstein's paper was entitled "Lens-like Action of a Star by the Deviation of Light in the Gravitational Field," and he credited R. W. Mandl with first presenting to him the idea behind the technical report. For want of information these stories mentioned Mandl as a young scientist.

Actually Mandl is no scientist except in the attic genius sense of the word and his bald head and 42 years definitely put him beyond the "young" stage. And for months, in Washington and in New York, Mandl has lived a precarious existence as dishwasher in third-rate restaurants and "coffee pots." He now tends a furnace for his room rent in a Corona, L. I., home.

Late last spring Dishwasher Mandl, whose hobby is drawing geometric designs on eggshells, walked into the offices of Science Service in the building of the National Academy of Sciences in Washington with a bundle of pieces of paper, covered with mathematical symbols, clutched in his hand.

Interpreter

His bald head gleamed in the sunlight and his baggy blue suit hung in folds. But his eyes shone as he presented himself, clicked his heels in continental style and began a hurried speech in broken English with relapses into his native tongue. Only the presence of a friend acting as semi-interpreter disclosed that Rudi Mandl had something more to offer than the "crank" type of

visitor to the offices of a newspaper or syndicate.

Yes, he did have something! He would show the astronomers a new test for the Einstein theory of relativity that was so simple that any person with a six-inch telescope could check it himself.

"You see," he said, "the light from a distant star will be bent as it passes the nearer star and the effect will be a great brightening that anyone can see with a small telescope." And he talked on and on excitedly for some minutes.

Would Science Service publish his discovery? The answer was at first no, for all manner of cranks present themselves monthly with every kind of fantastic idea. But would he like to have his expenses paid on a trip to Princeton to enable him to see Professor Einstein at the Institute for Advanced Study?

Clutching his papers and the money, he happily rushed off and went to Princeton. Probably no one will ever know exactly what took place at the meeting of the dishwasher and the father of relativity. They talked for some hours in German and probably Mandl, with this added fluency, presented his case better, for on his return he happily appeared and said that Professor Einstein would himself check his calculations and offer them for publication.

Weeks and months went by and too much daydreaming over sinks full of dishes in Washington restaurants made it expedient that Mandl transfer his vocation and avocations to the larger and newer fields of New York City. Finally a letter came to Science Service asking if and where Professor Einstein had published his calculations. And if not, why not?

Prepared for Publication

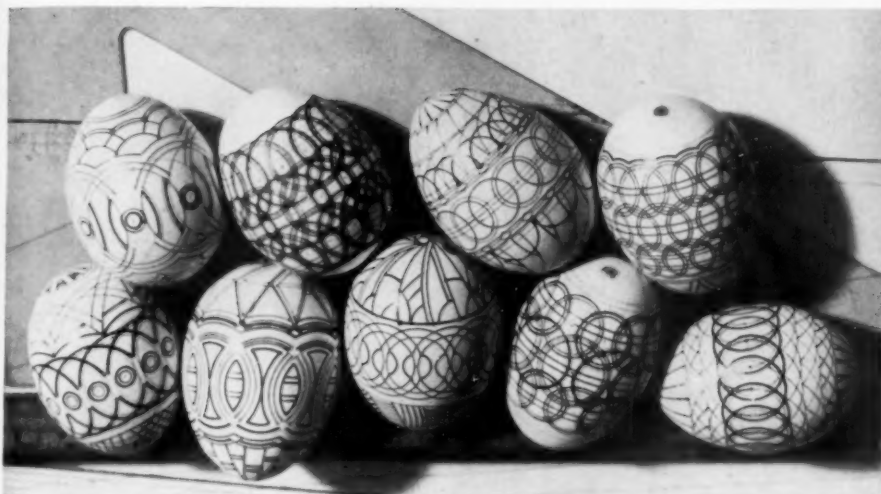
Acting again as intermediary, Science Service sent a letter to Professor Einstein asking about the matter. The courteous reply in German stated that the Mandl idea was interesting and would be ready for publication shortly.

The report in *Science* for Dec. 4, 1936, in which Professor Einstein begins



PROPOSES EINSTEIN TEST

Rudi W. Mandl, as he washed dishes in a restaurant, worked out an astronomical test of the relativity theory that won the approval of Professor Einstein and was published by him.



A HOBBY

Eggshells covered with geometric designs provide Mr. Mandl with an absorbing hobby and a means of livelihood.

with the specific statement, "Some time ago, R. W. Mandl paid me a visit and asked me to publish the results of a little calculation which I made at his request. This note complies with his wish," is the fulfillment of that promise.

It would be fine to be able to state that the theory and preliminary calculation of Rudi Mandl has upset or made a revolutionary contribution to the famous theory of relativity, but a close check of the calculations by Professor Einstein shows that the supposed lens-like action of one star on the light of another star is a very brief phenomenon, lasting only a few seconds at the most; so fleeting that Professor Einstein doubts if it can ever be observed experimentally.

Of this Einstein says at the conclusion of his report:

"... there is no great chance of observing this phenomenon, even if the dazzling light from the nearer star is disregarded." But he goes on to say:

"This apparent amplification of q by the lens-like action of the star is a most curious effect, not so much for its becoming infinite, with vanishing x , but since with increasing distance D of the observer not only does it not decrease, but even increases proportionally to the square root of the distance."

Rudi Mandl, dishwasher extraordinary, may not have set the world of science on fire as he hoped when he originally walked into Science Service's offices, but at least he has discovered what even such a great scientist as Einstein calls a "most curious effect" and made an original contribution to scientific thought. That thought might have

been lost but for Professor Einstein's generosity.

A thumbnail biography of Rudi Mandl would include the following: Born 42 years ago in what is now Czechoslovakia... began education at Technologisches Gewerbe Museum of Vienna in 1911... fought in Austrian army on eastern front... captured and sent to Siberia in 1915... escaped 1918... returned Vienna and graduated in 1919 as electrical engineer... left for South America but returned to Germany the next year to manufacture an electric iron he had invented... wiped out by German inflation of 1923... came to America... for two years was New York Public Library's most voracious reader... worked as busboy and dishwasher on weekends to obtain bare essentials of existence.

Science News Letter, December 19, 1936

HYGIENE

Water Wagon Advised For Tropical Residents

IF YOU are going to live in the tropics, you will climb aboard the water wagon if you know what is good for you.

Here is the recipe for successful living in a tropical climate, as given by Dr. Cecil K. Drinker, Harvard physiologist: No alcohol; adequate sleep, simple food, plenty of water, plenty of salt in the diet, and daily exercise.

Two years is probably the longest safe period for a white man to live in

the tropics, according to Dr. Drinker, whose studies of the effects of heat and humidity on the human body are made the subject of editorial comment in the *Journal of the American Medical Association*. (Dec. 5.)

The health of a man from a temperate climate begins gradually to deteriorate when he goes to the tropics, and the effects of the heat and humidity upon his wife and children are even worse.

Physical and Mental Changes

A tall, thin person is best fitted for tropical life, according to Dr. Drinker, for his body has a maximum surface for heat loss in relation to body weight.

Some of the bodily changes that have been noted among white residents of the tropics are as follows: The basal metabolism changes. Fertility is reduced. The pulse rate decreases slightly. The breathing rate decreases, but the minute volume of air is somewhat higher. Often a slight alkalosis develops. Blood sugar is likely to be low; the nonprotein nitrogen increases; the total phosphorus in the blood is lowered. The red blood cells increase slightly; the white cells decrease.

Children, after the age of three years, tend to become weak and apathetic, Dr. Drinker states. By the time they are ten years old, they are poor in initiative and application.

In the case of adults, the will power often weakens, laziness follows and sometimes vicious habits gradually develop.

Science News Letter, December 19, 1936

TECHNOLOGY

Dr. Clarence J. West Is Awarded a Medal

DR. CLARENCE J. WEST, editor at the Institute of Paper Chemistry, Appleton, Wis., will be presented next February with the medal of the Technical Association of the Paper and Pulp Industry.

Awarded for the first time for work outside paper research or development, the medal recognizes Dr. West's service since 1920 as chairman of the Association's committee on abstracts and bibliography.

Dr. West is the former director of the Research Information Service of the National Research Council and editor of the seven-volume *International Critical Tables*, which give the physical and chemical constants of all known materials.

Science News Letter, December 19, 1936

AVIATION

"Tomorrow's Airplane" Seen As Result of New Survey

**Doubled in Size With Greater Speed and Comfort,
Visioned Craft Will Be Powered by Four Engines**

A LUXURIOUS 20-passenger transport plane that will safely and economically span any two points in North America overnight—this is Tomorrow's Airplane.

Approximately 20 tons in gross weight, more than twice the size of our present land transport planes, the coming machine will have a total engine power ranging up to 4000 horsepower, about three times the rated power of today's common carriers of the air.

Only a little more than half of this tremendous power attains a non-stop range of 1250 miles in still air at a cruising speed of 225 miles an hour. The reserve power will maintain flying schedules even in the face of strong head winds.

Added Passenger Comfort

Arrangements for the comfort and safety of passengers will be even more elaborate than those featured by our modern transports. Day and night passenger accommodations will approximate the latest styled Pullman cars, including dressing rooms. A completely equipped galley will eliminate the necessity of landing for meals. In addition, the plane will carry a crew of five, and, of course, the latest radio and navigation equipment.

But most amazing is the fact that improvements already tested can keep the direct operating cost of such service down to approximately 23 cents per ton-

mile of pay-load, just about the direct operating cost of today's smaller and slower transports.

These are the conclusions of 15 aeronautical experts from the United Aircraft Corporation and the Massachusetts Institute of Technology, who have just completed a comprehensive study of the trend of transport airplane development. Their results are reported by Prof. Jerome C. Hunsaker, head of M. I. T.'s department of mechanical engineering, in charge of aeronautics, and George J. Mead, chief engineer of the United Aircraft Company.

Tomorrow's airplane, they emphasize, is not a dream for the distant future or even a theory of what is coming within a few decades. It is rather an airplane that could be designed today of proved components for tomorrow's use.

Has Greater Size

Nor is it in any sense a radical departure from the designs of air transports now in service. Tomorrow's airplane differs from them chiefly in its greater size and range, the use of four rather than two engines, its increased streamlining and higher speed, the greater comfort which it affords its passengers. Basically, they declare, these improvements are not fundamental alterations but rather refinements of today's transport.

Take the fuselage, for example. The most desirable shape, it has been found,

is the fish-shaped form used by airships. For the airplane this optimum form must be modified somewhat to give the pilot a clear view and to afford sufficient support at the extreme stern for control surfaces. In cross-section the fuselage is almost a perfect circle.

The wings of tomorrow's airplane are somewhat smaller than those now in use with corresponding gains in steadiness of flight and passenger comfort. They retain, however, one highly efficient feature already in use, the trailing edge flap which permits low speed for take-off and landing, and high speed for cruising.

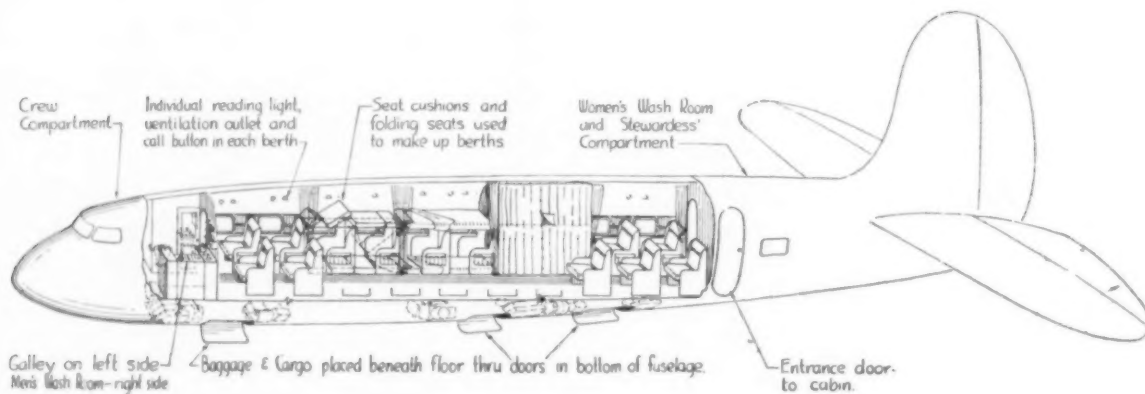
Four Engines Used

The power plant for tomorrow's airplane would have four engines since, if one fails, there will still be 75 per cent of the total power available instead of the 50 per cent available in the present standard twin-engine machine. Tomorrow's plane needs only 60 per cent of its rated power to keep to its schedule. It would be able to do so even if one engine failed completely under this arrangement.

More than four engines, it was found, would not provide a comparable increase in safety and therefore would not justify the additional complication in this size of plane. An uneven number of engines is undesirable because balance demands that one be placed in the nose of the fuselage to the detriment of pilot vision and passenger comfort. Fourteen-cylinder radial engines of an existing type, normally rated at 900 horsepower, are probably best suited for tomorrow's airplane because of their small size and weight and the large amount of surplus power readily available.

DETAILS

This drawing of the 20-ton transport plane of the future shows the interior arrangements.





TOMORROW'S PLANE

This photograph is of a model of the airplane of the future as forecast by aeronautical experts sounded out in a survey at the Massachusetts Institute of Technology.

Passenger and cargo accommodations are exceptionally large, the main cabin measuring 10 feet by 40 feet and being divided into 10 sections of two berths each, like those of a Pullman. The pilot's cab is at the forward end of the fuselage, followed by the men's dressing room and galley, and then the main cabin with the ladies' dressing room and passenger entrance just aft. The main cargo space is below the cabin floor and is filled from below through hatches which close flush with the fuselage.

225 Miles Per Hour

The result is an airplane of 20 tons gross weight of which more than six tons is so-called useful weight—crew, passengers, their baggage, fuel and oil and cargo—the last named estimated at about 1000 pounds. Its cruising speed of 225 miles per hour is nearly 50 miles faster than that of our modern transports, its non-stop range of 1250 miles is almost double that of today's transports, yet all at no increase in cost per unit of pay-load.

In their report the scientists also consider briefly the airplane of the future—one that might be in service in five or ten years, that would bring Europe within 24 hours of our shores. The propeller, the fuselage and tail will probably remain much the same, they declare. The engines will almost certainly be of the electric-ignition type now in use—not Diesels. The wings will be generally the same although smaller, due to more effective high lift devices.

With these improvements the airplane of the future should make the same speed as tomorrow's airplane with about

30 per cent less power. And the operating costs would be reduced about five cents per ton-mile as compared with tomorrow's airplane, under the same conditions of speed and cruising range. Safety will be as great and passenger comfort even greater. Transcontinental flights with intermediate stops will still probably be made at about 10,000 feet, although non-stop transoceanic ones may go to 25,000 feet. Higher cruising altitudes increase cost, and thus it is felt that the stratosphere as an avenue for transcontinental air traffic is not immediately commercially available.

Science News Letter, December 19, 1936

AVIATION-METEOROLOGY

Lake Behind Boulder Dam Will Make Smoother Flying

By PROF. CHARLES F. BROOKS,
Director, Blue Hill Observatory,
Harvard University.

AIRPLANE travelers over the Grand Canyon region are going to find smoother flying, now that Boulder Lake is backing up behind Boulder Dam.

Heretofore the air in that particular stretch has been notorious for its bumpiness. The bare rock walls of the canyon and the nearly bare dry lower slopes heat tremendously under sunshine. There are always some slopes that face the sun and on which the sun's rays fall perpendicularly. These get the hottest. Near by there are cliffs and slopes which are in the shadow. These may stay cool. The air in contact with the slopes becomes light near the sunned ones and dense by the shaded ones. The denser air pushes the lighter out

of the canyon and this lighter air rises in columns or small masses here and there, giving sharp bumps to any passing airplanes.

Now fill the canyon with a lake. Over a large surface the temperature is uniform and the air, therefore, has no local differences in temperature. The sunned side of the canyon above the level of the lake is as a whole warmer than the lake. So the denser air immediately over the lake tends to move as a body toward this sunned wall.

Ideal for Flying

Higher up, of course, there is a flow of air from the heated slopes back over the lake. In fact, without such an overflow of expanded air in the first place there could not have been much movement of the lake air toward the shore, for it would have to have the extra weight of the air above to give it the necessary push.

Over the lake the air must be generally quiet and sinking—ideal conditions for smooth flying.

That the large body of water now accumulating behind Boulder Dam will affect the climate of its immediate shores no one can deny, but how far will its influence extend? In the first place the lake will make the climate more temperate. With the relatively cool body of water present, the heating of the surrounding slopes will cause a tempering lake breeze outward from the lake by day. Such a tempering breeze cannot, however, be expected to extend beyond the valley. A general wind may blow the air farther, but under desert conditions the identity of the lake air would soon be indistinguishable.

Along with the relative coolness there may be expected an increase of moisture. The air would gain in mugginess what it lost in temperature. However, the air is so dry in the first place that the contribution of the lake locally could not produce enough vapor to make a really steamy atmosphere.

Can the vapor from the new lake increase the rainfall? Possibly it can, but if so it is not likely to be enough to be distinguishable by present methods of observation. When the Colorado River broke through its banks in 1906 and formed the Salton Sea, an increase in rainfall was looked for but none was found. The air of the desert is normally so dry that the small contribution that even a large lake can make to the passing wind cannot be enough to produce shower clouds.

PLANT PHYSIOLOGY

Christmas Trees May Be Kept Green by Chemical

SCIENCE has come to the aid of those people who will have a spruce or fir tree this coming Christmas. Remember how green and fresh your Christmas tree looked last year when you first set it up and trimmed it? And how soon it became dull and dropped its needles?

This year, however, you can go to the drug store and buy three inexpensive chemicals and make a solution which will preserve your cut tree fragrant and green for the full week of holiday festivities. You can thank Dr. R. H. Carr, professor of agricultural chemistry at Purdue University, for the following directions.

Go to your druggist and buy 15 grams of calcium carbonate, 5 grams of citric acid and 6 grams of malic acid. Mix the last two, which are both liquids, in three quarts of water. Save the calcium carbonate until you are ready to set up your tree.

Set the base of your Christmas tree in a wide-mouthed gallon bottle or a pickle crock and brace it with small, unnoticed wires. Then mix the calcium carbonate in the citric-malic acid solution and pour it all into the crock. As the tree drinks up the solution, add more water.

Hemlock is about the only tree which appears not to be aided by this treatment.

Science News Letter, December 19, 1936

PHYSIOLOGY

Eyestrain at College Measured by Physician

THE STUDENT pays dearly for a college education when, in addition to financial costs, he gives up part of his precious eyesight. It has long been suspected that four years of close and long attention to books might impair the vision. Tests of grade and high school students have been made to determine the effect of school work on eyesight, but there has been little actual knowledge of what happens to the eyesight of college students.

The extent of damage to vision resulting from the strain on the eyes incurred in obtaining a college education has now been measured on one thousand University of Minnesota students.

Of these thousand, about one in six had seriously defective vision on entering college, Dr. Ruth E. Boynton, asso-

ciate professor of preventive medicine and public health at the university, found. At the end of the four years in college, this percentage had increased. About one in four of the students had seriously defective vision at the time of graduation.

Most of these students were enrolled in the medical school or the college of education. Upon entering the university, eye examinations showed that about half of them had normal vision. About another third (30 per cent) had slight defects in vision, and 18 per cent, not quite a fifth, had serious defects in vision. The number with seriously defective vision increased to nearly a fourth (24 per cent) by the time of graduation.

College work was hardest on the eyesight of those students who started out with the greatest visual handicap, Dr. Boynton told a conference of the National Society for the Prevention of Blindness.

"Students having the lowest visual acuity when entering the university had the most marked decrease in vision at the end of four years."

The layman will be surprised to learn that nearsightedness is apparently less of a handicap to the college student than either farsightedness or astigmatism. A large percentage of nearsighted students were among those with the highest scholastic records.

Science News Letter, December 19, 1936

METEOROLOGY

Indians Watch White Men For Weather Portents

ALL THIS time white men have been watching squirrels for weather signs. And now it turns out Indians have been watching white men for the same reason. Maybe the squirrels watch the Indians—who knows?

Matching the weather lore that a hard winter is coming when squirrels hide lots of nuts, is the old Onondaga Indian belief that when the white man cuts "heap much wood for fire" it is going to be a long hard winter.

The New York State College of Forestry, has called attention to this Indian weather superstition. If the white wood-chopper is no more accurate a forecaster than the squirrels, he is not much of a weather prophet. Meteorologists have disproved repeatedly the reliability of such weather signs.

Anyway, here's the news: The white man is cutting much firewood this year.

Science News Letter, December 19, 1936

IN SCIENCE

PHYSIOLOGY

Newborn Cannot Breathe Without Elastic Muscles

A NEWBORN baby cannot start breathing unless his muscles have sufficient elasticity, even though he has been making respiratory or breathing movements for many weeks before birth, Dr. Yandell Henderson of Yale University told members of the Connecticut Academy of Arts and Sciences.

At birth this muscle elasticity—doctors call it tonus—should normally start in response to messages from the motor centers of the spinal cord, Dr. Henderson explained. Many times, however, this does not happen, and the baby is born in asphyxia and is in danger of dying from a form of suffocation.

Dr. Henderson compared the baby born in asphyxia to a stalled automobile engine.

"As with the motor, so with the baby, a restoration of activity may be induced in two ways," Dr. Henderson said. "The motor may be cranked and spun until, in spite of poor carburetion and ignition a 'cough' is induced. The baby likewise may be manhandled, as it formerly was, until a reflex gasp is elicited. Or, on the contrary, in the car the carburetor and ignition may be adjusted until the motor starts at a touch. And in the baby the oxygen and carbon dioxide that its nervous system needs may be supplied by inhalation, as has now become the accepted practice; and resuscitation is thus effected without 'cranking.' In such resuscitation it is not merely respiration that is involved."

The Dionne quintuplets were saved by the latter method, Dr. A. R. Dafoe using the inhalation method introduced by Dr. Henderson.

Dr. Henderson's conception of how breathing begins and is maintained includes the following succession of events: at birth the motor centers of the spinal cord come into action; by inducing tonus in the musculature of the body they increase metabolism and heat production, and render respiration effective. Without muscle tonus the blood would stagnate in the tissues, and the circulation would fail, he concluded.

Science News Letter, December 19, 1936

EN FIELDS

ARCHAEOLOGY

Christmas Story Told In Egyptian Frescoes

EGYPT, the land where the infant Jesus found refuge from his cruel enemy, Herod, has yielded a new picture-story of his life, particularly of his birth and childhood, on the walls of a tiny, old, unpretentious church near the extreme southern boundary of the land, at the Second Cataract of the Nile. A German archaeologist, Prof. Friederich Wilhelm Freiherr von Bissing, has visited the place, almost as lowly as the Stable of Bethlehem itself, and has brought back notes and pictures of the ancient, marred frescoes that still adorn its mud walls.

The church was built in the seventh or eighth century, and the frescoes are done in the formalized style of that date; they seem quaint to modern eyes. But they tell the old familiar story of the Nativity in their own way: the Infant in the manger, the coming of the shepherds, the visit of the Magi. A less conventional scene shows little Jesus getting a bath, like any other baby.

Other frescoes take up the life of Christ in his later years. The tragic Cross of Golgotha figures prominently. God the Father and the Holy Ghost are also shown, not bearded as in the art of northern lands, but young and clean-shaven.

Science News Letter, December 19, 1936

GEOLOGY

Retreating Advance Is Paradox of Glaciers

THE PARADOX of a moving force pressing steadily forward and yet at the same time receding is offered in the glaciers of Mount Rainier National Park. The glaciers are constantly flowing downward from their source, veritable rivers of ice. But at the same time they are melting backward at the outer end, or snout.

Nisqually Glacier, for instance, which is well known to visitors to Paradise Valley as the park's most easily accessible ice mass, retreated 65 feet in 1936, as against 54 feet in 1935, according to measurements taken annually by

scientists of the national park staff. The snout of the Nisqually Glacier may be seen from the road halfway between the park entrance near Longmire Springs and Paradise Valley.

Park records show that in 1857, when the first summit climb of Mount Rainier was attempted, this glacier extended to a point 750 feet below the present automobile bridge over Nisqually River. Now the ice has retreated to a point approximately three-quarters of a mile above the bridge.

Paradise Glacier, another favorite with visitors to the Paradise Valley and locale of the famous "tin-pants sliding" on paraffined-seated pants, also showed a marked retreat. One point on this glacier's snout, where no record could be made last year because of snow conditions, showed a retreat of 76 feet in a two-year period. Another point showed an ice retreat of 83 feet. A third point, also under snow last year and therefore not measured then, showed a 34-foot recession in two years. The average recession of Paradise Glacier in 1935, at points that could be checked, was 48.7 feet.

The Carbon Glacier, while not so well known to the visiting public as the two above mentioned, staged a relatively more spectacular recession, with 67 feet in 1936 as against only 24 feet in 1935.

Emmons Glacier, longest in the United States, retreated 45, 100, and 193 feet at three points measured in 1936, but these high figures were caused by peculiar melting and other conditions at those particular points and the figure of 45 feet is taken by park authorities as the local recession for 1936, as against 48.5 feet for 1935. South Tahoma Glacier showed 1936 recessions of 79 and 66 feet from two points, as against 61 feet last year. Stevens Glacier lost 146 feet in 1936.

Science News Letter, December 19, 1936

METEOROLOGY

New Device is Aid In Measuring Rainfall

A NEW instrument for measuring rainfall has been invented by an employe of the State Meteorological Hydrographical Institute, and several of the instruments are already in use in Sweden.

The new measuring device is reported to be very light in weight, to have unusual accuracy, and to keep records for a week at a time without being touched. The inventor has applied for a patent.

Science News Letter, December 19, 1936

BIOPHYSICS

Virus Crystals Produced By Whirling in Centrifuge

PROTEIN crystals of the virus responsible for the mosaic disease of tobacco have been prepared by whirling at terrific speed in a centrifuge, instead of the more conventional methods involving chemical treatment and evaporation, by Drs. Ralph W. G. Wyckoff and Robert B. Corey of the Rockefeller Institute for Medical Research (*Science*, Dec. 4).

Clear juice pressed from diseased tobacco plants was centrifuged until a pressure of 40,000 times gravity was produced. Small solid pellets were found in the apparatus, which under the microscope were plainly crystalline in structure. These were compared, by X-ray analysis, with crystals of the mosaic-protein substance obtained in the conventional way, and the ray-patterns thus produced were indistinguishable. "The two substances must, therefore, be substantially identical," Drs. Wyckoff and Corey conclude.

Science News Letter, December 19, 1936

ASTRONOMY

Was Star of Bethlehem Three Bright Planets?

WISE men wondered about a certain star they saw in the East, nearly 2000 years ago. Today's wise men are wondering still.

Was this bright celestial herald really a triple phenomenon? Modern astronomers suggest that it may have been the planets Jupiter, Saturn, and Mars, grouped closely together in a little triangle. Such a grouping, astronomers calculate, occurred about Feb. 25, in the year 6 B. C. It is generally agreed now that due to a calendar miscalculation during the Middle Ages, the real date of the birth of Jesus occurred between 4 and 11 B. C. So the suggestion is not an impossible one.

The planetaria now possessed by four American cities and more than a score of European ones make it possible to project a picture of the skies of Judea, as of that date, on the inside of a great dome. The three bright planets are thus shown in a miraculously bright triangle.

Other suggestions for a natural explanation for the appearance of the Star of Bethlehem include comets, novae or suddenly flashing "new" stars, and fireballs or great meteors.

Science News Letter, December 19, 1936



ARCHAEOLOGY

Toy Town 5,000 Years Ago

In India Long Ago, Toymakers Fashioned Wagons, Rattles, Whistles, Marbles for Good Boys and Girls

By EMILY C. DAVIS

A SANTA CLAUS town that made toys for the good little children in 3000 B.C. has been unearthed—in India.

And what toys, you promptly ask, did the good little children ask for?

What could the jolly toymakers make in those "high and far-off times"?

For answer, archaeologists can now produce a large assortment of 5,000-year-old toys. They show you marbles and whistles, gay rattles, sheep that rolled nicely on two wheels and had strings attached for leading the painted beasts. They display ox-carts ready to be loaded with pebbles and pulled around the floor. Any modern child could amuse itself with these old, old playthings.

Unearthing this oldest of Santa Claus towns has fallen to the good luck of American archaeologists.

When the Indian government let down the bars that forbade foreigners to dig in this region, two years ago, two American organizations promptly seized the chance. Forming a joint expedition, the Boston Museum of Fine Arts and the American School of Indic and Iranian Studies arranged to dig into three mounds of earth at Chanhu-daro.

Dead Cities

Hidden inside many such mounds of earth have been found dead cities of the East, with streets and stumps of walls piled layer upon layer, just as the people leveled off wreckage of one demolished city to build anew on the ruins.

At Chanhu-daro, the American archaeologists, led by field director

Ernest Mackay, burrowed through two layers of cities and probed down 13 feet, when they found themselves in the town of toys.

More and more playthings they picked out of this third layer of ruins. The toys were like rare plums or prizes hidden in a big earthen pudding. Mr. Mackay came to realize that here were far too many playthings to supply children of one town alone, however fortunate.

Center of Toy Trade

The only explanation seems to be this: Chanhu-daro in its distant day was like Germany's Nuremberg, a picturesque and flourishing center of toy trade.

Toys found at Chanhu-daro break at least one record for antiquity. Certainly no archaeologist ever before has made such a haul of early toys in quantity. And as individual objects these toys of 3000 B.C. rank high among the world's oldest playthings.

There are, of course, objects thousands of years older that may be toys—or they may not. Nobody can tell about them. There is a little brown Teddy Bear 20,000 years old, for example, found in a grotto of southern France. The little stone bear is a gem of realistic Stone Age art. But whether it was the familiar plaything of a cave man's child, or whether it was a charm used in dangerous magic and not for children to dare touch, will probably never be proved.

A set of chessmen discovered last season dates from almost 4000 B.C. These alabaster game pieces were found in the grave of a little boy who lived

in the city of Tepe Gawra, in Mesopotamia. But they represent amusements of a rather older lad, not exactly in a class with the very young children's toys that the Indian town has so lavishly revealed.

People examining the Indian playthings are struck by their modern appearance. But that modern touch is what archaeologists have come to expect when they dig up any bit of ancient toy history.

Toys for the littlest children have not changed much in 5,000 years. Same old wheel-toy-on-string. Same rattles, whistles, balls, and carts to load and unload.

It is a curious touch of human psychology, that mothers and fathers of so early a time seized upon essential features of play that would amuse the babies.

The relative appeals of color, noise, shape, and other fine points of toy psychology can now be explored scientifically. But so far as the toys go, in basic principle, the Bronze Age toy makers did their work so well that there has been little change or improvement these thousands of years.

Wheels That Turn

Toy makers of Chanhu-daro put time and care into their work. A toy ox cart from the ruins is found equipped with clay wheels that turn, and with stakes around the cart edge to keep the load from tumbling off. A shaft is attached to the cart, and two humped oxen of clay to pull it. Real carts of this very type can be seen on Indian roads today.

When the Indian toy makers cut marbles out of shell, they took trouble to carve designs around the surface to make the little balls pretty. Rattles for the babies were brightly painted.

If there were wood carvers in Chanhu-daro, who cut wooden animals and dolls and painted them for the children, that evidence is lost. Wood was too perishable to survive so long in that climate.

Clay, however, is more enduring, and fortunately for the archaeologists who are re-discovering the ancient history of toys, clay was standard stuff for toy making.

A toy maker would shape a clay hen, with holes for producing a whistle.

Then he, or she—for women have often been the potters in early civilization—would paint the little hen with a pleasing striped pattern. And no modern critic can object that hens are not striped like tigers, when modern toy makers revel in pink plush elephants and checked gingham dogs.

Even children made toys in the world's oldest known town of this trade. Imitating their elders for the fun of it, they shaped toys of mud and baked them hard in holes in the ground covered with fuel.

Your eyes take in the familiar, and the strange, details of these ancient toys. And you try to imagine youngsters so very long ago laughing and playing with these very objects, in a town just progressing from the Stone Age into the Age of Bronze. It is not too easy to picture the scene.

But archaeologists come to the rescue of modern imagination. They can report from their discoveries what the toy town in India looked like.

Even in its ruined state, this ancient town is surprisingly modern. It was a well-planned settlement, and a progressive one. The brick houses were equipped with central heating; flues under the floors warmed the rooms in cold weather. Mr. Mackay declared that nearly every house had its bathroom and drains. Houses were aligned along streets and lanes in true city fashion. And every street had drainage.

Superior Sanitation

With high praise for this system, Mr. Mackay pronounces it superior in sanitation to that found in cities of other civilizations of its time. Many cities of the Orient today are not so well equipped, he declares.

Like many other buried cities, Chanhu-daro is known mainly by the durable articles it produced. Clothing and other fragile things have long since vanished in the earth. The ancient people of India did, however, engrave pictures on seal amulets showing what their clothing, furnishings, and other

features of their life were like, and these add greatly to information gathered from the real relics of stone, clay, metal and bone that have survived.

People of Chanhu-daro, it seems, took to the new fashion of using copper and bronze to replace old-fashioned stone. Their ruined city contains metal chisels, spear heads, blade axes, and vessels. But just as motorized America still has its horses, so Bronze Age Chanhu-daro still used old reliable stone for kitchen knives and some other utensils.

Toilet tables of clay with four short legs are among trophies from the ancient city, showing that personal appearance was rated important. A bronze jar that held a cosmetic is another relic of the beauty table. And a great many stone palettes, on which eye paints and other beautifiers could be mixed and prepared, have been discovered.

Elaborate Headdresses

Headdresses were elaborate, so Mr. Mackay learned from styles worn by clay figurines of goddesses. And like Egyptian women, the Indian woman who had her hair freshly done could sleep on a nice hard head-rest that would not crush the coiffure. This Indian pillow was made of painted pottery.

First and foremost, so the digging reveals, Chanhu-daro was a trade town. It had the economic good fortune to stand on an Indian trade route. Toy makers could stuff their packs and dis-

patch them by ox-load or caravan over well-traveled highways to distant cities.

Beads were another notable product, for which the town may have gained fame. In the ruins, the American archaeologists have discovered many agate and carnelian beads. So fine is the polish on these beads that craftsmen of the Indian town are hailed as experts at working hard stones.

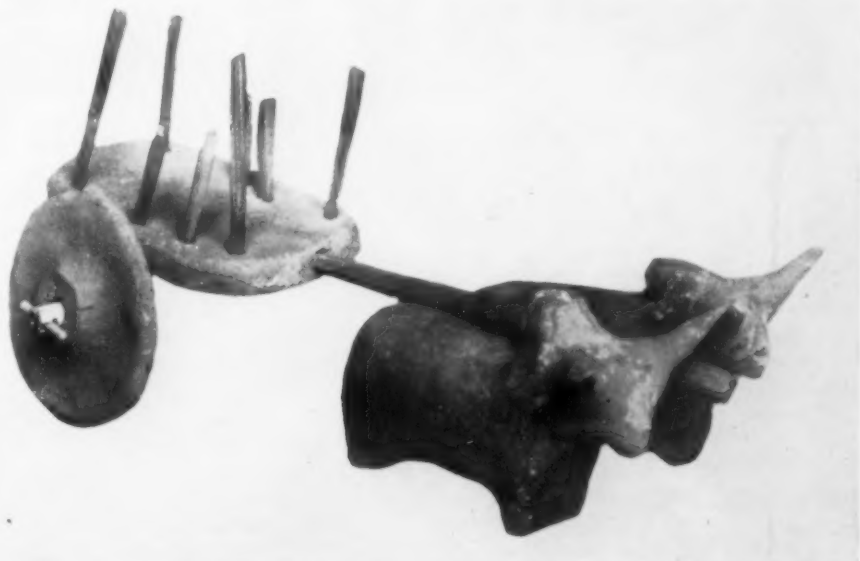
Used Stone Drills

And what is particularly remarkable about this bead work is that they used stone drills—not copper, as archaeologists had always supposed the ancients must have used to bore bead holes. What abrasive helped them is still to be learned. It may have been emery.

Bead makers of Chanu-daro did amazingly tiny work. Buried in their city for 5,000 years has lain a string of beads so small that 40 can be strung to the inch. Nothing coarser than a hair would string these pin-point beads. The beads are of soft material, as stone goes. But how those craftsmen with their simple tools ever bored the tiny objects is a puzzle to the archaeologists who have discovered them.

When unearthed, these beads were stuck together by the salty soil. They had apparently been put away in a basket, long since vanished.

There can be no doubt that Chanhu-daro was a keen business center. Good evidence is the large number of stone



AND THE WHEELS GO ROUND

This wagon which gladdened the hearts of children long before the first Christmas might be enjoyed equally by any modern youngster. Carts of this same type may be seen on the roads of India today drawn by oxen like those here reproduced in clay.



CENTRAL HEATING

For a modern home of 3000 B. C.—five flues are shown in right foreground with branch flues at right angles, to carry warmth under the brick floor throughout the building.

weights found through the ruins. These weights are mainly cubes, carefully polished and graded to a simple ratio of 1, 2, 4, and so on. Business was supervised, even as far back as the dawn of the Bronze Age, so archaeologists surmise, for similar weights recovered from the two other Indian towns of the age that archaeologists have so far explored, are of similar size. And that means that weighing of goods for sale was strictly supervised, with short measure not allowed.

How far trade of the Indian cities spread is not yet known. Toys from this place may have given pleasure to children many miles away. But did they reach the cities of Mesopotamia—Tepe Gawra, Erech, Ur of the Chaldees, and others—1,400 miles to the northwest? The land of Egypt was even more distant, with the Arabian desert to be crossed.

With only two or three Indian towns of 3000 B.C. unearthed, archaeologists are already convinced that India was not aloof from its great rivals and neighbors in the dawn of civilization. Heretofore, the cradle lands of our civilization have been considered two—Egypt and Mesopotamia. Now, India is revealing itself as a third civilizing power at the third corner of a great sprawling triangle.

Objects proving to archaeological

satisfaction that India did have contacts with Mesopotamian cities have already been discovered. And this part of the world's ancient story is only beginning to open up.

Until a few years ago, the oldest civilization in India that was clearly demonstrated was no older than 300 B.C. Yet, the literature of India testified to people far older than this, and mentioned strong forts left by people before 1500 B.C.

Then British archaeologists struck the first discovery of India's real antiquity, and announced finding city ruins at Mohenjo-daro as old as 3000 B.C., and since then India has been drawn more and more closely into the tangled pattern of civilization.

The new-found city, Chanhu-daro, had its greatest glory when it was young, so the ruins reveal. The later settlements shrank. After the age of the toy and bead makers, there followed a people who lived in matting houses and walked on rough paving, very different from the old city's substantial dignity. These later people made great quantities of pottery, which archaeologists hope will shed more light on migrations and trade relations of 2000 B.C.

Last on the toy town site were a few primitive folk who made dark gray pottery and marked it with geometric de-

signs. This curious ware is unfamiliar even to archaeologists well acquainted with the clay craftwork of the past. Wandering gypsy-like tribes, Mr. Mackay believes, may have been the last industrialists at the once-thriving town of the toys.

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Science News Letter, December 19, 1936

From Page 387

apes, of white men, and of Negroes. He finds:

"In these points the cartilages of the anthropoid apes are nearer those found in the Negro than in white individuals. The cartilages in man are proportionately much larger than in the anthropoid apes as would follow from the difference in the prominence of the noses of the two. In the Negro, however, though the cartilages are much larger than in the gorilla, yet there is comparatively little difference in the prominence of their noses."

Smallest Monkey Embryos

Embryos of the common macaque monkey (the organ-grinder's favorite assistant) in their very earliest stages of development have been studied by Dr. George L. Streeter, director of the department of embryology, in collaboration with Dr. G. B. Wislocki of the Harvard Medical School. Embryos only a few days old, before they had become attached to the wall of the uterus, were found in numbers sufficient to make detailed microscopic examinations possible.

One of the outcomes of this study has been a considerable modification of the classic germ-layer doctrine, which teaches that all parts of the developing embryo originate from three primitive layers of cells: endoderm, ectoderm, and mesoderm. Drs. Streeter and Wislocki have found that while these layers do account for the development of the parts of the body itself, the several membranes in which the unborn infant is wrapped, as well as other accessory structures, originate from primitive initial tissues that are laid down before the three germ layers are formed.

Science News Letter, December 19, 1936

The "Father of Botany," Theophrastus, described many plants so carefully that botanists today can identify these trees and shrubs that grew in Greek gardens.

RADIO

"Standing Room Only" Sign Out for Radio Wavelengths

The Ultra-Short Band Now Being Considered For Addition to Practical Spectrum is Already Crowded

THE "STANDING room only" sign is already out for the ultra-short radio wavelengths which the Federal Communications Commission is now considering for addition to the practical radio spectrum, it was revealed by T. A. M. Craven, chief engineer of the Commission. Mr. Craven was guest speaker at the First National Conference on Educational Broadcasting.

Present practical usefulness of the radio goes down to the short waves with a frequency of 30,000 kilocycles (10 meters), he pointed out. Already under consideration and due for use very soon is the radio spectrum band from 30,000 kc to 200,000 kc, or to one and a half meter waves.

"At first glance," declared Mr. Craven, "this seems to be a tremendous increase over the present 30,000 kc. However, again we find distinct limitations because of the increasing demands and because of new developments."

New Uses

Acceptable television, he pointed out, will need over half of the now untapped radio frequencies. Blind landing systems for airplanes, with their great increase in aerial safety, would use these wavelengths. Facsimile transmission by radio would likewise require this radio band. Finally there is the growing use of lightweight portable transmitters in the police and forestry services, which require the use of these new short waves. At a recent hearing of the Communications Commission, he added, the preliminary estimate of the radio needs of the Government services alone was such that one-half of the newly developed portion of the radio spectrum would be required.

Speaking with Mr. Craven on the program were Dr. C. B. Jolliffe, former chief engineer of the Commission and now with the Radio Corporation of America, and Dr. Alfred N. Goldsmith, well-known radio consulting engineer of New York City.

All three men, without stating so in so many words, pointed out that the hope of some educators to have 15,000 stations serving 127,000 school districts

was not likely to be fulfilled. They emphasized that every time a new radio band is made available there seems to be room for everybody who wishes to operate a radio transmitter; but that the crowding ever becomes greater on the radio waves.

\$1,000,000 a Year

A million dollars a year is being spent by business executives to find out how many people listen to their radio broadcasts. But still they do not know anything about the extent to which their listeners are really paying attention to the program, Dr. Henry C. Link, of the Psychological Corporation, New York, told a discussion group at the Conference.

Sponsors of educational programs also have a need to study their audiences, Dr. Link told his colleagues. Even the rough measures now obtained by the sponsors of commercial programs of the numbers listening in are of value in planning programs to meet the interests of listeners. He told of a survey made by means of personal interviews in farm homes, rural town homes and cities.

"The audiences found for the educational programs at these centers were pitifully small in comparison with the audiences for commercial or sustaining programs," he said, "even when the relative power of the stations is borne in mind. On the other hand, an amazingly large number of commercial programs were described, by many of these people, as being programs of general educational value."

Mere Repetition Won't Teach

Mere repetition may not deserve the faith that radio advertisers have in it as a means for impressing audiences, Prof. Edward S. Robinson, of Yale University, told his listeners at another session of the Conference.

The discoveries of psychologists have great importance to successful educational broadcasting, he pointed out. The matter of repetition he cited as an example.

"Rare is the occasion upon which a new idea is grasped from a single presentation," he said. "Yet the ideal of educational broadcasting is not to be gained from the often fatiguing and annoying repetition in which the commercial advertiser has such faith. The results obtained from many studies of learning indicate that the optimal repetition varies with the material presented, with the audience, and with many other factors."

Arguments over whether the radio is as effective as the printed word or some other means of communication are pointless, Prof. Robinson indicated. The radio is being used and will continue to be whether or not it is as effective as some other method of communication, he said. The psychologist can aid in the improvement of broadcasting technique.

Science News Letter, December 19, 1936

PALEONTOLOGY

30,000,000-Year-Old Fish Brought Back From Alaska

FOSSILS of freshwater fish, found abundantly in Tertiary deposits in Alaska, have been brought back by an expedition headed by Dr. Erich Maren Schlaikjer of Brooklyn College, to be classified and studied at the American Museum of Natural History in New York. The formation where they were found is about 30 million years old.

Science News Letter, December 19, 1936

PHYSIOLOGY

Artificial Ear-Drums Aid Hard-of-Hearing

ARTIFICIAL ear-drums, very simply made out of a paraffin-impregnated fabric, have been devised by a Belgian scientist, Dr. J. P. Delstanche, for the aid of hard-of-hearing persons.

Science News Letter, December 19, 1936

Portraits of Eminent Mathematicians

By David Eugene Smith

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THEY LIVE IN THE MUSEUM

The two ivory-billed woodpeckers in this woodland group have been dead for over 60 years. Yet through a clever combination of modern museum methods and recently made sound films, they are made to go through the motions of life, and call out with the voices of their own remote grandchildren.

MUSEUM SCIENCE

Stuffed Birds Now Move and Sing in Museum Exhibits

BIRDS and beasts mounted in museum cases can now "perform" for visitors, flying and leaping, singing and calling in their natural voices, just as you would see and hear them in the woods. It is all owing to a new technique in museum preparation worked out by Prof. A. A. Allen, noted ornithologist of Cornell University, which combines sound-effect movies with the mounting of prepared specimens against a realistic background of stones, trees, and other environmental materials brought in from the wild.

When you stop in front of the museum case, you first see the mounted specimens. They are like all other modern museum specimens—very lifelike and natural, but still and silent, as though under a magician's spell.

Then you press a button. Immediately a motion picture screen rolls or slides into the place of the glass case front. On this the same group is projected in exactly the same position, from a motion picture machine. The birds and animals "go into their dance," moving and sing-

ing exactly as they did in nature when the sound film was taken by the naturalist-cameraman in the woods.

The film, as a matter of fact, has been used as a guide in setting up the museum group. The birds and beasts are put into exactly the same position that they occupied in the first frames as it was photographed.

The first group to be installed is one of ivory-billed woodpeckers in a Louisiana swamp. Stowed away in the Cornell University Museum was a pair of ivory-bills that were collected about 1875 and mounted in the conventional manner of that day on blocks of wood. It was Professor Allen's idea to make these birds live again.

Accordingly last year he directed the Brand Cornell-American Museum expedition into the swamps of northern Louisiana, and with the assistance of the Louisiana Conservation Department he and his colleagues, Paul Kellogg, George Sutton and James Tanner, were successful in securing motion pictures and voice recordings of the rarest of North

American birds. They likewise shipped back a section of the trunk of a swamp maple containing a deserted nesting cavity made by a pair of ivorybills.

Of course no birds were collected, but the 60-year-old mounts in the Cornell Museum were soaked up and remounted by E. J. Sawyer to match the first frames of the motion pictures which the expedition secured. The commonest bird associates of the ivorybill in the Louisiana environment were added to the group, each one matching a sound picture. A pileated woodpecker, somewhat similar to the ivorybill in size and color, but entirely different in voice, was painted on the background by Mr. Sawyer, and a parula warbler nesting in pendent Spanish moss, and a prothonotary warbler nesting in a hollow stub were mounted to match motion pictures and added to the foreground.

One after another these birds can be brought to life. While the whole group does not move as a unit, the closeups of the various components moving and calling help to give realism to the group in its entirety and thereby achieves the ambition of the artist, the taxidermist and the director of the museum, and comes nearer to satisfying the nature-loving public.

Motion pictures and sound have already been secured by the Cornell ornithologists for another group. It now awaits only the funds for its construction.

This group portrays the ruffed grouse and its associates in a New York state woodland in May. The central figure is that of a male grouse in full display on a mossy log with a female stepping on to her nest oblivious to his charms. In the background is another male grouse on his drumming log. A song sparrow is seen amid pussy-willows, a pair of brown thrashers atop a brush pile, white-throats scratch in the leaves of the foreground, a flicker digs his nest cavity in a birch, a pileated woodpecker returns to its nest in a dead beech, a late flock of Canada geese are flying across

● RADIO

December 22, 5:15 p.m., E.S.T.

TOYS OLD AND NEW—Watson Davis, Director of Science Service, Washington, D. C.

December 29, 2:30 p.m., E.S.T.

THE YEAR IN SCIENCE—Watson Davis, Director of Science Service, Washington.

In the Science Service radio series over the Columbia Broadcasting System.

the sky, and a barred owl sits in a hollow tree.

At a turn of the switch, the displaying grouse begins to shake his head and hiss, the female takes her place on the eggs, and the male in the background starts to drum so that one not only hears the rhythmic thumps but sees exactly how the sound is produced. The song sparrow and the brown thrashers sing, the flicker throws out chips of dead wood, the pileated woodpecker calls and disappears into his hole, the wild geese pass overhead honking, the owl hoots.

The use of sound motion pictures to give greater realism to museum groups, Professor Allen points out, has endless possibilities. There is no reason why mounted lions should not roar, wolves howl and deer snort as well as the birds sing when the cinematographer and sound technicians take their places with the taxidermist, the artist and the collector in gathering the material and setting up the habitat groups of the future. Furthermore, the usefulness of the museum groups can be greatly extended because the motion picture film is easily duplicated and can be shipped all over the country, while the original group is available to only the comparative few who visit the museum.

Science News Letter, December 19, 1936

DENDROLOGY

Christmas Holly Trees Have Their Flowers Too

See Front Cover

DESPITE the popularity of the familiar red holly berries for Christmas decorations, few of us are familiar with the rare beauty of the holly tree's flower. The illustration on the front cover of this week's SCIENCE NEWS LETTER is one of the superb enlargements in Walter E. Rogers' book on *Tree Flowers*.

Prof. Rogers tells why many holly trees bear no berries at all. The holly flowers are of two sexes; the berry-less trees are those with exclusively staminate flowers. The two flowers are very much alike in general appearance.

Science News Letter, December 19, 1936

Coming!

The *Science News Letter* for December 26 will contain the Science Review of the Year. Important scientific achievements in 1936 will be classified by sciences. An excellent issue for your permanent records. Order extra copies now.



Christmas Oak

OAKS had a Yuletide significance to our ancestors of northern and western Europe that we have forgotten, to a very considerable degree. It is regrettable, too, that we have done so, for some of these ancient oak observances were picturesque and meaningful.

Bringing in the Yule log was a mid-winter ceremony that survived as long as houses were heated by open hearths and wood was the fuel. The Yule log was usually an oak log. But when coal began to be substituted, and then closed stoves came in (we have commonsense-skeptical old Dr. Benjamin Franklin to thank for that!), such mass uses of wood fuel passed out.

Oaks figured prominently, too, in the ancient Celtic rites of the mistletoe, for the mistletoe shrub is a semi-parasite that gains part of its nourishment from the sap of hardwood trees, again usually oaks, at least in European woods. To be sure, there are mistletoe species that grow on evergreens, but nobody except a botanist would recognize them as such. And the girls don't want to receive Yuletide attentions exclusively from botanists!

Oaks even helped provide the Christmas feast, for the mighty wild boar, whose smoking head burdened many a castle's high table at Yuletide, fed on acorns and beechnuts in the forests. And acorns, ground into flour, sometimes kept famine at bay when there had been a bad grain crop.

Oaks provided timbers for houses and castle and cathedral roofs, planking and ribs for ships, staves for such house-gear as casks and pails. Oak bark went into the tanner's pits to make leather. Oak galls, soaked with scraps of iron, furnished monastery scribes with ink that after centuries remains unfaded. In

oaken coffins men were borne at last to the churchyard.

Small wonder then that people regarded the oak so highly, and even in pagan times made a god of it. If oak trees were green in winter like firs and spruces and pines, the chances are that our Christmas trees would all be oaks.

Science News Letter, December 19, 1936

Eat And Lose Weight!

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•First Glances at New Books

Entomology

THE BIOLOGICAL CONTROL OF INSECTS—Harvey L. Sweetman—*Comstock*, 461 p., \$3.75. A comprehensive treatment of the whole subject of biological control, discussing not only the familiar subject of "setting a thief to catch a thief" with insect against insect, but also such angles as the use of predatory vertebrates, of viruses and fungi, of invertebrates other than insects, and the encouragement of insect devourers of plants when the plants they devour happen to be weeds. Particularly interesting and useful is the chapter on modern methods of introducing insect parasites and predators.

Science News Letter, December 19, 1936

General Science

YEAR BOOK NO. 35: July 1, 1935—June 30, 1936—*Carnegie Institution of Washington*, 411 p., paper, \$1, cloth, \$1.50. See p. 387.

Science News Letter, December 19, 1936

Juvenile Fiction

IN THE STONE AGE, A BOY'S STORY OF EARLY PALEOLITHIC TIMES—Gregory Trent—*Harcourt, Brace*, 362 p., illus., \$2. The doings of people called Ak, Gog, Olu-Ra, Broken Nose and Whitehead, their enemies the Fire People, the saber-tooth cats and the rhinoceroses they feared, the lesser game they hunted, the fights they had, and how Ak finally won leadership of the horde.

Science News Letter, December 19, 1936

Zoology

ANIMALS OF THE CANADIAN ROCKIES—Dan McCowan—*Dodd, Mead*, 302 p., illus., \$3. Popular discussions of the mammalian fauna of one of North America's most interesting faunistic regions, in easy-going style that will charm many readers. The full-page half-tone illustrations (and there are a lot of them) are of exceptionally high quality and add not a little to the value of the book.

Science News Letter, December 19, 1936

Chemistry

CARBON DIOXIDE—Elton L. Quinn and Charles L. Jones—*Reinhold*, 294 p., \$7.50. The newest volume in the American Chemical Society series of scientific and technologic monographs. Selection of the material has been based on the very broad treatment of the many phenomena in nature and industry in which

carbon dioxide is an important factor. The needs of the industrial worker, the research student and the general reader have been kept in mind. Little effort has been made to make a detailed analysis of the carbon dioxide industry today because it was felt that such a review would have only historical interest in a very short time.

Science News Letter, December 19, 1936

Ventilating

VENTILATION MANUAL FOR SHEET METAL CONTRACTORS—Paul R. Jordan—*Scott*, 351 p., \$3. Non-technical discussion of ventilation.

Science News Letter, December 19, 1936

Physics

COSMIC RAYS, BEING THE HALLEY LECTURE DELIVERED ON 5 JUNE 1936—P. M. S. Blackett—*Oxford*, 25 p., II plates, 75c. Condensed into 25 pages of printed matter is a summary of cosmic rays by one of England's best known scientists. The subject is broken up into its three important classifications; geophysical, physical and astronomical aspects.

Science News Letter, December 19, 1936

Aeronautics

AIRPLANE AND ENGINE MAINTENANCE FOR THE AIRPLANE MECHANIC—Daniel J. Brimm and H. Edward Bogges—*Pitman*, 493 p., illus., \$2. Detailed discussion of the work of an aviation mechanic on a strictly trade basis. The volume is designed for three functions: 1. To serve as a home study course for the student mechanic; 2. as an aid to the instructor and students of secondary schools which may train aviation mechanics; 3. as a reference and handbook for the licensed mechanic.

Science News Letter, December 19, 1936

Geography

ARIZONA AND ITS HERITAGE—*University of Arizona*, 291 p., illus., \$1.50. An unusual publication, this bulletin contains 40 chapters each describing some interesting feature of Arizona. Topics include birds, vegetation, climate, Indian agriculture, national monuments, population and sociology.

Science News Letter, December 19, 1936

Nature Study

OUR PETS, 215 p.; ON THE FARM, 225 p.—Clyde Fisher and Marion L. Langham—*Noble and Noble*, each, 96c. Big-print nature-story books for youngest readers, with many attractive colored pictures.

Science News Letter, December 19, 1936

Ornithology

OCTOBER FARM, FROM THE CONCORD JOURNALS AND DIARIES OF WILLIAM BREWSTER—Ed. by Smith O. Dexter, introduction by Daniel Chester French—*Harvard*, 285 p., \$2.50. William Brewster was doubly blest: he loved birds, and he had many human friends who loved him. His intimate notes on his feathered friends (and much else that a man who uses both his eyes will see outdoors) have here been collected and sympathetically edited by one of the most intimate of his human friends. Naturalists everywhere will welcome the publication of this book.

Science News Letter, December 19, 1936

Food

THE STORY BOOK OF FOODS FROM THE FIELD: WHEAT, CORN, RICE, SUGAR—Maud and Miska Petersham—*Winston*, 128 p., colored illus., \$2.50. The stories of four of mankind's most important grass-formed foods, from the prehistoric twilight to the modern age of harvesting and processing super-machinery, told in simple but interesting style. Just the thing for children who have learned to read with some fluency, and who are getting their first geographical thrills out of learning about what other children do in other lands.

Science News Letter, December 19, 1936

Engineering

A. S. T. M. STANDARDS ON ELECTRICAL INSULATING MATERIALS—*American Society for Testing Materials*, 329 p., \$2.

Science News Letter, December 19, 1936

Botany

OLD-FASHIONED GARDEN FLOWERS—Donald Culross Peattie—*Field Museum*, 31 p., illus., 25c.

Science News Letter, December 19, 1936

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